Introduction

One of the significant impacts on patient outcome in emergency medical situations is the response time taken for emergency medical services (EMS) to arrive at the scene. "response time" is measured from the time EMS is notified by dispatch, to the team’s time of arrival, with the current average time in the US being 9.4 min.1

11.2% of all response times are >12 min,2 but research suggests that a time of 6 min. is critical for sparing the life of a cardiac patient3 and can improve survival outcome by 6.5%.4

Unmanned Aerial Vehicles (UAV) have the potential to medical technology and supplies to a patient in much shorter time, while the medical team is en route.

Our study, considered Phase 1 of a multi-stage project, examined this possibility by applying the use of UAV to a mock emergency of a cardiac patient.

Methods

The ECG was an AliveCor Kardia model attached to an iPhone 5.

Written instructions for a layperson to operate the ECG were included with the UAV. A summary of said instructions can be seen in Figure 1.

The UAV was flown 100 yards on an open field, with clear sky conditions and 5 MPH wind flowing from west to east.

Once the UAV landed, the ECG device was attached to an iPhone 5.

The ECG reading shown in Figure 4 shows a clear printout that could be evaluated by a medical professional, with a PQRST consistent with normal heart beat on a test subject.

The total flight time for 100 yards across an open field was two minutes, or approximately 2.5 ft/sec.

The video and audio systems on board can be utilized in the future to gather information from a patient as well as transmitting instructions from a receiving physician.

The ultimate aim is to be able to carry other medical devices, such as emergency medications or a defibrillator.

Data and Results

A chi-squared analysis of data (Table 1) showed a significant p-value (p<.01), proving that our UAV was successful in navigating faster than the national average time for emergency response.

Conclusion

Unmanned Aerial Vehicles can significantly decrease the time needed for emergency medical response.

This first phase of a multi-phase project provides incentive and justification to continue exploring UAV technology beyond a 12-Lead ECG.

References